CLAIMS:

1. Method for controlling an up-converter (100) having an input (2) for receiving an alternating input voltage (MAINS), the up-converter (100) further having an output (3), the method comprising the steps of:
providing an inductor (5) and a diode (6) connected in series with said output (3);
providing a capacitor (8) connected in parallel to said output (3);
providing a controllable switch (7) having one switch terminal coupled to a node between the inductor (5) and the diode (6);
feeding the inductor (5) with a rectified AC voltage (Vi) derived from said alternating input voltage (MAINS);
generating a switch control signal (S_C) having a substantially constant repetition frequency and a varying pulse width (T_H), for switching said switch (7) open and closed;
generating a first measuring signal (So) representing the output voltage (Vo) at said output (3);
sampling the first measuring signal (So) at a first predetermined sampling frequency;
digitally processing the sampled first measuring signal (So) to calculate the pulse width (T_H) of the switch control signal (S_C) such that the output voltage (Vo) remains substantially constant; and
setting the pulse width (T_H) in accordance with the calculation result.

2. Method according to claim 1, wherein the said processing of the sampled first measuring signal (So) and the said calculation of the pulse width (T_H) is performed by a software program running in a suitably programmed controller (110).

3. Method according to claim 1, wherein the pulse width (T_H) is updated at a predetermined updating frequency.

4. Method according to claim 1, further comprising the steps of generating a second measuring signal (Si) representing said rectified AC voltage (Vi);

sampling the second measuring signal (Si) at a second predetermined sampling frequency, which preferably is equal to the first predetermined sampling frequency, the second measuring signal (Si) and the first measuring signal (So) preferably being sampled simultaneously;

wherein the pulse width (T_H) of the switch control signal (S_C) is calculated in accordance with the following formula:

$$T_H = K\sqrt{\frac{V_O - V_i}{V_O}}$$

wherein K is a multiplication constant depending on device parameters.

5. Method according to claim 1, wherein the first predetermined sampling frequency is substantially equal to the said repetition frequency of the control signal (S_C).

6. Method according to claim 1, wherein the up-converter (100) is part of a driver (300A; 300B) for a gas discharge lamp.

7. Method according to claim 1, wherein the input (2) of the up-converter (100) is connected to mains.

8. Up-converter (110), comprising:

an input (2) for receiving an alternating input voltage (MAINS);

an output (3);

a rectifier (4) having its input connected to said input (2), and having an output providing a rectified AC voltage (Vi);

an inductor (5) and a diode (6) connected in series with the output (3), the inductor having a first terminal (5a) coupled to said output of said rectifier (4) and having a second terminal (5b) coupled to said diode (6);

a capacitor (8) connected in parallel to the output (3);

a switch (7) having one switch terminal coupled to a node between the inductor (5) and the diode (6);

a digital processor (110) having a first input (118) coupled to receive a first measuring signal (So) representing the output voltage (Vo) at said output (3), and further having a control output (117) coupled to a control terminal of said switch (7);

the digital processor (110) being adapted:

- to generate at its control output (117) a switch control signal (S_C) having a pulse width (T_H) and a substantially constant repetition frequency, for switching the switch (7) open and closed;
- to sample the first measuring signal (So) at a first predetermined sampling frequency, which preferably is equal to the said repetition frequency;
- to digitally process the sampled first measuring signal (So) to calculate the pulse width (T_H) of the switch control signal (S_C) such that the output voltage (Vo) remains substantially constant;
- and to set the pulse width (T_H) of the switch control signal (S_C) in accordance with the calculation result.

9. Up-converter according to claim 8, wherein the digital processor (110) comprises a software program running to perform at least the step of calculating the pulse width (T_H) of the switch control signal (S_C).

10. Up-converter according to claim 8, wherein the digital processor (110) further comprises a second input (114) coupled to receive a second measuring signal (Si) representing the said rectified AC voltage (Vi);
the digital processor (110) being adapted to sample the second measuring signal (Si) at a second predetermined sampling frequency, which preferably is equal to the said first sampling frequency, the digital processor (110) preferably being adapted to sample the second measuring signal (Si) simultaneously with the first measuring signal (So);
the digital processor (110) being adapted to calculate the pulse width (T_H) of the switch control signal (S_C) in accordance with the following formula:

$$T_H = K\sqrt{\frac{V_O - V_I}{V_O}}$$

wherein K is a multiplication constant depending on device parameters.

11. Driver (300A; 300B) for a gas discharge lamp, comprising an up-converter (100) according to claim 8.